

MISCELLANEOUS PHENOMENA.

FOREST AND PRAIRIE FIRES.

Forest and prairie fires occurred at the following places:
 Pike's Peak, Colorado: on the 9th a prairie fire of small extent was burning on the plains toward the southeast.
 Fort Reno, Indian Territory: prairie fire, 25th.
 Comfort, Texas: prairie fires, 26th, 27th, 28th.
 Duke, Florida: forest fires, 9th, 18th.

METEORS.

Meteors were observed on the following dates:
 Florida.—Merritt's Island, 2d, 27th; Archer, 9th; Limona, 11th; Alva, 26th.
 Illinois.—Jacksonville, 21st.
 Iowa.—Monticello, 28th.
 Maryland.—Woodstock, 1st, 11th, 13th, 15th, 16th, 19th, 25th; Fallston, 16th.
 Massachusetts.—Blue Hill Observatory, 12th; Vineyard Haven, 19th.
 New Hampshire.—Nashua, 28th.
 Wisconsin.—Manitowoc, 19th, 21st.

MIGRATION OF BIRDS.

Geese flying northward.—Fort Reno, Indian Territory, 9th; Saint Louis, Missouri, 17th; Fort Madison, Iowa, 12th, 17th; Augusta, Georgia, 18th; Globe, Kansas, 20th; Rappahannock, Virginia, 23d, 27th, 28th; Manhattan, Kansas, 26th; Brownville, Nebraska, 27th, 28th; Erie, Pennsylvania, 28th.
Geese flying southward.—Augusta, Georgia, 14th; Manhattan, Kansas, 17th; East Portland, Oregon, 20th, 22d, 24th; Mottville, Michigan, 21st; Dale Enterprise, Virginia, 23d, 24th, 26th.
Ducks flying northward.—Pekin, Illinois, 8th, 15th, 25th; Jacksonville, Illinois, 23d; Tatoosh Island, Washington Territory, 25th; Manhattan, Kansas, 27th.
Ducks flying southward.—Memphis, Tennessee, 2d; Jacksonville, Illinois, 11th; Davenport, Iowa, 17th.

POLAR BANDS.

Polar bands were reported from the following stations:
 Arkansas.—Lead Hill, 26th.
 California.—Keeler, 22d.
 Florida.—Archer, 18th, 26th; Duke, 17th.
 Illinois.—Pekin, 25th; Riley, 10th, 25th.
 Indiana.—Laconia, 4th.
 Kansas.—Salina, 25th, 27th.
 Maine.—Gardiner, 5th.
 New Jersey.—Beverly, 9th; Moorestown, 16th.
 North Carolina.—Hatteras, 27th.
 Ohio.—Napoleon, 3d, 9th, 25th; Wauseon, 25th, 28th.
 Pennsylvania.—Catawissa, 4th, 25th.
 Virginia.—Dale Enterprise, 24th, 25th; Wythville, 6th, 9th, 19th, 22d.
 Washington Territory.—Tatoosh Island, 14th.

SUN SPOTS.

Mr. H. Govey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the 4th, 18th, 19th, 24th, 26th, and 28th.

SAND STORMS.

Salt Lake City, Utah: brisk to high south and northwest winds prevailed during the 1st, attaining at 4.30 p. m. a velocity of thirty-three miles per hour; at 5 p. m. the wind backed to northwest and increased in force; in the afternoon, and at night the air was filled with alkali dust from the desert west of the Great Salt Lake, covering all exposed objects with a white coating.

Sand storms occurred also at the following stations:

Abilene, Texas, 10th.
 Rio Grande City, Texas, 26th, 27th.
 Yuma, Arizona, 15th, 22d.
 Fort Grant, Arizona, 22d.

WATER-SPOUT.

Capt. E. O. Clark, of the barkentine "Josephine," reports: "18th, at 1.36 p. m., Greenwich mean time, in N. 29° 57', W. 79° 45', sighted a large water-spout about sixteen degrees above the horizon and about one mile wnw. from the vessel; the spout moved gradually to the northward, with a squall going in the same direction."

VERIFICATIONS.

INDICATIONS.

The predictions for February, 1887, were made by 1st Lieutenant Thomas M. Woodruff, 5th Infantry, Acting Signal Officer and Assistant, and were verified by 2d Lieutenant F. M. M. Beall, Signal Corps, U. S. Army, Assistant.

The detailed comparison of the tri-daily indications for February, 1887, with the telegraphic reports of the twenty-four hours for which the indications were prepared, shows the general average percentage of verifications to be 72.74. The percentages for the different elements are: Weather, 70.74; wind, 67.01; temperature, 76.68. By states, etc., the percentages are: For Maine, 76.88; New Hampshire, 72.50; Vermont, 71.01; Massachusetts, 75.12; Rhode Island, 73.87; Connecticut, 70.74; eastern New York, 76.19; western New York, 78.81; eastern Pennsylvania, 73.93; western Pennsylvania, 75.83; New Jersey, 76.16; Delaware, 73.22; Maryland, 77.64; District of Columbia, 74.10; Virginia, 75.50; North Carolina, 71.99; South Carolina, 69.43; Georgia, 73.81; eastern Florida, 68.72; western Florida, 71.32; Alabama, 74.79; Mississippi, 71.25; Louisiana, 70.18; Texas, 66.70; Arkansas, 67.08; Tennessee, 69.76; Kentucky, 74.11; Ohio, 70.89; West Virginia, 71.79; Indiana, 74.82; Illinois, 72.80; eastern Michigan, 73.65; western Michigan, 72.00; Wisconsin, 71.81; Minnesota, 71.34; Iowa, 75.71; Kansas, 70.57; Nebraska, 69.76; Missouri, 74.11; Colorado, 72.23; east Dakota, 65.00.

There were nine omissions to predict, out of 9,996, or 0.09 per cent. Of the 9,987 predictions that have been made, seven hundred and seventy-eight, or 7.79 per cent., are considered to have entirely failed; seven hundred and thirty-one, or 7.32 per cent., were one-fourth verified; 2,266, or 22.69 per cent., were one-half verified; 1,556, or 15.58 per cent., were three-fourths verified; 4,656, or 46.62 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

Below are given for the Pacific coast the percentages of indications verified for January, 1887; this data was received too late for publication in the REVIEW of that date. From the 1st to the 3 p. m. report of the 8th the predictions were made by 2d Lieutenant W. A. Glassford, Signal Corps, U. S. Army, Assistant, during the remainder of the month by 2d Lieutenant J. E. Maxfield, Signal Corps, U. S. Army, Assistant. They were verified by 1st Lieutenant Thomas M. Woodruff, 5th Infantry, Acting Signal Officer and Assistant. The percentages for the different districts are: Washington Territory, 78.05; Oregon, 78.06; northern California, 78.12; southern California, 84.64.

CAUTIONARY SIGNALS.

Of the total number of signals ordered during February, 1887, it was practical to determine the verifications of two hundred and seven; of these, one hundred and sixty-nine, or 81.64 per cent., were fully verified both as to direction and velocity. Number of signals ordered for on-shore winds, seven; verified, six, or 85.71 per cent. Number of signals ordered for northeast winds, ten; fully verified both as to direction and velocity, seven, or 70.00 per cent. Number of signals ordered for northwest winds, one hundred and two; fully verified both as to direction and velocity, seventy-eight, or 76.47 per cent; verified as to velocity only, seven, or 6.86 per cent. Number of signals ordered for winds without regard to direction, eighty-eight; verified, seventy-eight, or 88.64 per cent. Number of signals ordered late, i. e., after the verifying velocity had begun, seventeen, or 8.21 per cent.

In addition to the above, three hundred and ninety-eight sig-

nals were ordered at display stations, the verifications of which it was impracticable to determine.

In twenty-eight instances winds were reported which would have justified the display of cautionary signals, but for which no signals were ordered, and in one instance a wind which would have justified the display of on-shore signals, but for which no signals were ordered.

COLD-WAVE SIGNALS.

Total number of cold-wave signals ordered, the verifications of which were determined, two hundred and fifty-eight; verified, one hundred and eighty-nine, or 73.26 per cent. Fifty-four signals were ordered, the verifications of which it was impracticable to determine.

In addition to the above, in one thousand and thirty-five instances, the signals ordered from this office were repeated by the observers at the regular stations to towns in their vicinity. The verifications of these it was impracticable to determine.

RAILWAY WEATHER SIGNALS.

P. H. Mell, jr., director of the "Alabama Weather Service," in the report for February, 1887, states:

The verification of predictions for the whole area was 89 per cent. for temperature, and 80 per cent. for weather.

The following corporations comprise this system: South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus and Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Western and Atlantic; East Tennessee, Virginia and Georgia system in Georgia; Montgomery and Eufaula; Pensacola and Selma; Pensacola and Atlantic; the cities of Milledgeville, Georgia, and Talladega, Alabama.

The following is from the "Bulletin of the New England Meteorological Society" for February, 1887:

Verification of weather signals at New Haven was 85.7 per cent. for temperature, 92.9 for weather.

STATE WEATHER SERVICES.

The following is an extract from the February, 1887, report of the "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The mild weather during a portion of February, and the high temperature until the last few days, exerted an invigorating influence upon vegetation; and in many portions of the state blossoms and leaves burst forth very early in the month. The temperature was 7°.6 above the normal.

Rains were frequent during the month but thunder-storms were of rare occurrence, even though the temperature remained so high. On the 11th, 18th, and 26th strong winds occurred, but of such moderate force as to commit no damage. Severe storms and tornadoes were warded off from the state because of the high pressure that prevailed during the entire month, with the exception of the 20th, when a low wave passed over the state, producing an unusually heavy precipitation at all stations. The rainfall of the month was 0.61 of an inch below the normal.

The temperature for the winter months just ended indicates a slight range above the normal, 1°.8; while the precipitation was 2.23 inches below the normal.

Summary.

Mean temperature, 56°.8; highest temperature, 81°, at Eufaula, on the 18th; lowest temperature, 20°, at Gadsden, on the 28th; range of temperature, 61°; greatest monthly range of temperature, 54°, at Florence and Gadsden; least monthly range of temperature, 39°, at Selma and Troy; mean daily range, 11°.3; greatest daily range of temperature, 37°, at Eufaula, on the 11th; least daily range of temperature, 0°, on the 22d, at Mount Willing.

Mean depth of rainfall, 4.18 inches; mean daily rainfall, 0.146 inch; greatest depth of monthly rainfall, 9.40 inches, at Trinity; least depth of monthly rainfall, 2.35 inches at Bermuda; greatest daily local rainfall, 2.95 inches, at Eufaula, on the 20th.

Average number of days on which rain fell, 8; average number of cloudy days, 16; average number of fair days, 6; average number of clear days, 6; warmest days, 18th and 23d; coldest day, 28th; prevailing direction of wind, southeast.

The following is an extract from the February, 1887, report of the "Arkansas Weather Service," Mr. George R. Brown, of Little Rock, director:

Hail was reported from Mount Ida the 2d, and from Fayetteville the 14th and 25th.

A general sleet prevailed throughout a greater part of the state on the 4th, being reported from Fayetteville, Springdale, Osceola, and Little Rock, also from Memphis and Cairo.

The largest amounts of rainfall in one day were on the 13th, at Conway, 1.7; Fayetteville and Osceola, 1.5; and on the 14th, at Russellville, 3.55; Mount Ida, 2.0.

Thunder-storms occurred at Little Rock the 14th and 17th; Mount Ida, 17th and 23d; Conway, 23d, and at Fayetteville, 25th. During the storm of the 17th at Little Rock a house was struck by lightning, which was also struck about the same time last year, although in the interval it had been fitted up with lightning-rods. The damage this time was not as great as last year.

High winds prevailed generally on the 12th, 25th, and 26th, and several points report more or less damage done by the wind on those days.

The highest temperatures occurred at Fayetteville University, 85°, on the 28th; at Eureka Springs, 81°, on the 16th; at Mount Ida and Conway, 74°, on the 28th.

The lowest temperatures at Springdale, 18°, and Eureka Springs, 14°, on the 3d. The month was generally warmer than usual.

There were three cold-wave signals ordered during the month. The most severe wave was one which entered the state at the northwestern part on the evening of the 3d, and during the night and next day prevailed over the entire state. It was most noticeable in the central portion, the temperature at midnight, the 3d, being above 60° and next morning 23°.

The following is an extract from the February, 1887, "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, of Springfield, director:

The month was noted for its mildness, excessive cloudiness, and precipitation in the form of rain. The mean temperature of the state averaged 2° above the normal for the month. The highest temperatures were recorded from the 7th to the 10th, and the lowest on the 4th. The lowest monthly mean temperature reported was 20°.7, from Galena, and the highest, 43°.4, from Golconda, a range of 22°.7 from the extreme northwest to southeast sections of the state—within 0°.2 of the January range of mean temperature covering the same extent of territory.

The precipitation was heavy and evenly distributed, averaging 1.4 inches above the normal for the month. The snowfall was barely appreciable, except in the extreme northern counties, where it averaged nearly 10 inches. With but three exceptions, all stations reported the monthly precipitation in excess of the February normal. The exceptions were Springfield, 0.18; Mattoon, 0.78; and McLeansborough, 0.05 below the normal. The most marked departures above the normal are as follows: Riley, 3.03; Davenport, 3.12; Peoria, 3.28; Keokuk, 3.28, and Makanda, 4.27. The average snowfall in the state for the month was 2.9 inches; for the northern counties, 6.3 inches; central counties, 0.9 of an inch, and southern counties, 0.6 of an inch. The greatest total snowfall was 16.8 inches at Lake Forest; the least, inappreciable, throughout the central and southern counties.

West to northwest gales were reported on the evening of the 26th and morning of the 27th, caused by a severe storm moving easterly over the Lakes.

The sunshine did not exceed 83 per cent. for the month.

The cold-wave predictions of the 2d-4th, 8-9th, 10-12th, 23d-25th, and 26-27th were fully justified; that of the 14-15th was not justified, the temperature falling but 10°. Although the temperature was sufficiently low for frost on nearly every day of the month, yet its formation was retarded by excessive cloudiness, foggy mornings, and great percentage of humidity.

Thunder-storms, with hail and sleet, were frequent.

Summary of the winter of 1886-'87.

The mean temperature of the past winter for the state was 24°.5; the highest temperature reported was 75°; the lowest, -32°. The average precipitation was 8.29 inches. Prevailing direction of the wind, northwest. There were 25 clear, 25 fair, 40 cloudy, and 26 days on which appreciable precipitation fell.

The following is an extract from the February, 1887, report of the "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The mean pressure for the month was considerably above the normal, while the range was the greatest recorded in sixteen years. The barometer was very high at the beginning of the month and continued rising until the 4th, when the highest point was reached—30.901 at Lafayette. From the 4th it continued falling until the 10th, when there was a rapid rise until the 18th, after which the downward motion began again and continued until the 18th, when the lowest point was reached—29.130 being recorded at Fort Wayne. There was another very rapid rise until the normal was reached on the 19th; then a very decided fall on the 26th, followed by as decided a rise on the 27th. The month was thus characterized by great and abrupt fluctuations in the pressure, the extent of which has seldom been equalled.

The temperature was from four to six degrees above the normal, with about the average range. Four cold waves passed over the state, on the 1st, 4th, 12th, and 27th, corresponding with the "highs" of the barometer. The highest temperature was on the 10th, immediately followed by the lowest on the 12th and 13th, making a range of 72° in two days.

The precipitation was everywhere above the normal from four to six inches, according to locality, and was unusually heavy on the 2d and 3d all over the state, and again on the 26th. It was nearly all in the form of rain, only little snow being reported, and that only from the northern part of the state.

The following is an extract from the February, 1887, report of the "Kansas Weather Service," Mr. J. T. Lovewell, Topeka, director:

The mean temperature has been below the average. Cold waves were frequent and were invariably announced by the Chief Signal Officer from twelve to twenty-four hours in advance.